



CBCS SCHEME

USN

--	--	--	--	--	--	--	--	--	--

17EC72

Seventh Semester B.E. Degree Examination, Dec.2023/Jan.2024

Digital Image Processing

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain the fundamental steps in digital image processing. (10 Marks)
- b. Explain various image sensing and acquisition methods. (10 Marks)

OR

- 2 a. Explain the process of image sampling and quantization in digital image processing. (08 Marks)
- b. Explain the significance of isoference curve in an image processing. (06 Marks)
- c. Consider the image segment shown in Fig.Q2(c). Let $V = \{1, 2\}$ and compute the length of the shortest 4-, 8- and m-path between p and q. If particular path does not exist between these two points, explain why?

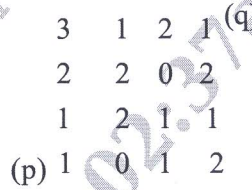


Fig.Q2(c)

(06 Marks)

Module-2

- 3 a. Explain with plots, some basic intensity transformation functions. (10 Marks)
- b. With relevant equations, discuss the discrete Laplacian of two variables and different implementation of Laplacian operator masks. (10 Marks)

OR

- 4 a. Discuss with relevant diagrams, the image smoothing using the frequency domain low pass filters :
 - i) Ideal
 - ii) Butterworth
 - iii) Gaussian(10 Marks)
- b. Explain the following selective filter :
 - i) Bandreject and Bandpass Filters
 - ii) Notch Filters(10 Marks)

Module-3

- 5 a. Discuss how periodic noise can be reduced by frequency domain filtering. (10 Marks)
- b. Explain the ordered statistic filter's used for image restoration. (10 Marks)

OR

- 6 a. Explain the following methods to estimate the degradation function used in image restoration:
i) Estimation by image observation. (10 Marks)
ii) Estimation by experiment (10 Marks)
- b. Explain the Weiner filtering method of restoring images in presence of noise and blur. (10 Marks)

Module-4

- 7 a. Explain the following color models :
i) RGB ii) HSI (10 Marks)
- b. Explain Pseudocolor Image Processing. (10 Marks)

OR

- 8 a. Explain the following Morphological operations:
i) Erosion
ii) Dilation
iii) Opening
iv) Closing (10 Marks)
- b. Explain multi-resolution expansions used in image processing. (10 Marks)

Module-5

- 9 a. Discuss various masks used to compute the gradient of an image. (10 Marks)
- b. Explain region splitting and merging. (10 Marks)

OR

- 10 a. Explain the following image representation techniques:
i) Signatures (10 Marks)
ii) Skeletons (10 Marks)
- b. Discuss segmentation using morphological watersheds. (10 Marks)
